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10/538,280	06/10/2005	Yusei Ukawa	JP02 0024 US	1869

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PHILIPS ELECTRONICS NORTH AMERICA CORPORATION
INTELLECTUAL PROPERTY & STANDARDS
1109 MCKAY DRIVE, M/S-41SJ
SAN JOSE, CA 95131

EXAMINER	
TYNAN, MATTHEW	
ART UNIT	**PAPER NUMBER**
2871	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,280	UKAWA, YUSEI	
	Examiner	Art Unit	
	Matthew Tynan	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/10/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 6/10/2005 was filed after the mailing date of the instant application on 6/10/2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Fujimori et al. (U.S. Pub. No. 2003/0117551).

5. Regarding claim 1, Fujimori et al. discloses:

- A color filter (24, Fig. 17) for coloring a first light ray having a unidirectional optical path and a second light ray having a bidirectional optical path for each pixel, comprising: a first coloring portion for coloring the first light ray and a

second coloring portion for coloring the second light ray, the first coloring portion having a greater thickness than the second coloring portion (**[0131]**, lines 4-8), the first coloring portion being formed in subsidence with respect to the second coloring portion (see Fig. 17) with a principal plane of the first coloring portion (portion contacting layer 150) being different in height from a principal plane of the second coloring portion by a predetermined value (e.g. 2.5 microns, **[0132]**).

6. Regarding claim 2, Fujimori et al. discloses:

- The predetermined value is a value required to substantially equalize or mutually optimize a first optical effect and a second optical effect (**[0135]**), the first optical effect being to be exerted on the first light ray by a portion of a liquid crystal layer corresponding to the first coloring portion, and the second optical effect being to be exerted on the second light ray by a portion of the liquid crystal layer corresponding to the second coloring portion when the liquid crystal layer is used in a liquid crystal display panel to which the color filter is applied.

7. Regarding claim 3, Fujimori et al. teaches the optical effect is an effect of causing retardation. The equal path lengths (Dt and 2xDr, respectively) through the liquid crystal for the transmissive and reflective regions ensures equal retardation for light from each region.

8. Regarding claim 4, Fujimori et al. discloses that the first coloring portion has a thickness that provides a greater coloring effect than the second coloring portion, i.e. the first coloring portion is thicker than the second coloring portion. See paragraph **[0131]**, lines 4-8.

9. Regarding claim 5, Fujimori et al. discloses the first coloring portion has a thickness substantially twice as great as the second coloring portion (**[0131]**, lines 4-8).

10. Regarding claim 6, Fujimori et al. discloses the color filter further comprises a step-forming layer (22') of an optical transmissive material (**[0155]**, lines 1-6) which supports the second coloring portion for providing the first and second coloring portions with thicknesses different from each other by the predetermined value.

11. Regarding claim 7, Fujimori et al. discloses the step-forming layer is colorless and transparent (**[0157]**).

12. Regarding claim 8, Fujimori et al. discloses the step-forming layer (22') includes and optically transmissive base material and multiple particles of optically transmissive material having a refractive index different from a refractive index of the base material and being scatteringly mixed in the base material (**[0157]**).

13. Regarding claim 9, Fujimori et al. discloses

- A liquid crystal display device (Fig. 17) using a color filter (24, Fig. 17) for coloring a first light ray having a unidirectional optical path and a second light ray having a bidirectional optical path for each pixel, comprising: a first coloring portion for coloring the first light ray and a second coloring portion for coloring the second light ray, the first coloring portion having a greater thickness than the second coloring portion (**[0131]**, lines 4-8), the first coloring portion being formed in subsidence with respect to the second coloring portion (see Fig. 17) with a principal plane of the first coloring portion (portion contacting layer 150) being different in height from a principal plane of the second coloring portion by a predetermined value (e.g. 2.5 microns, **[0132]**).

14. Regarding claim 10, Fujimori et al. discloses:

- The color filter (24) is provided on a substrate (20) at a display face side (see Fig. 17) of the liquid crystal display device.
- The opposite substrate (10) is provided with a pixel electrode (12, 13) comprising a transmissive electrode part (12) for causing the first light ray to be transmitted therethrough and a reflective electrode part (13) for causing the second light ray to be reflected therefrom.
- An area of the first coloring portion is aligned with an area of the transmissive electrode part, and an area of the second coloring portion is aligned with an area of the reflective electrode part (see Fig. 17).

15. Regarding claim 11, Fujimori et al. discloses that the transmissive electrode part (12, Fig. 17) and the reflective electrode part (13) have principle surfaces of substantially the same height.

16. Regarding claim 12, Fujimori et al. discloses that there is a difference of height (i.e. 0 microns) between principal surfaces of the transmissive electrode part and reflective electrode part, and a sum value of this difference of height and the predetermined value is a value required to substantially equalize a first optical effect and a second optical effect, the first optical effect being to be exerted on the first light ray by a portion of a liquid crystal layer corresponding to the transmissive electrode part, and the second optical effect being to be exerted on the second light ray by a portion of the liquid crystal layer corresponding to the reflective electrode part when the liquid crystal layer is used in a liquid crystal display device to which the color filter is applied.

17. Specifically, the structure disclosed in Fig. 17 requires the difference in height between the transmissive (12) and reflective electrodes (13) and the predetermined value add up to ensure equal retardation in both transmissive and reflective areas. The equal path lengths (Dt and 2xDr,

respectively) through the liquid crystal for the transmissive and reflective regions ensures equal retardation for light from each region.

18. Regarding claim 13, Fujimori et al. discloses:

- A method of manufacturing a color filter (24) for coloring a first light ray having a unidirectional optical path and a second light ray having a bidirectional optical path for each pixel, comprising the steps of:
- Depositing an optically transmissive material (22', Fig. 17) on a base layer (20).
- Patterning the deposited layer of optically transmissive material to form a step forming layer (22') wherein at least one recess-shaped portion (**[0131]**, "a region having no transparent dielectric layer") is formed for a pixel, the recess-shaped portion having a bottom face of a predetermined shape corresponding to an area wherein the first light ray is caused to be transmitted and a wall face of a predetermined height.
- Depositing a material (24) for coloring the first and second light rays on the step forming layer and the recess-shaped portion so as to form a first coloring portion for coloring the first light ray and a second coloring portion for coloring the second light ray, the first coloring portion having a greater thickness than the second coloring portion, the first coloring portion being formed in subsidence with a principal surface of the first coloring portion being different in height from a principal surface of the second coloring portion by a predetermined value (i.e. 2.5 microns, **[0132]**).

19. Regarding claim 14, Fujimori et al. discloses:

20. A method of manufacturing a liquid crystal display device, comprising the steps included in a method as defined in claim 13, wherein the color filter (24, Fig. 17) is provided to one substrate (20) of the liquid crystal display device and the other, opposed substrate (10) is provided with a pixel electrode (12, 13) comprising a transmissive electrode part (12) for making the first light ray to be transmitted therethrough and a reflective electrode part (13) for making the second light ray to be reflected therefrom, the display device manufacturing method further comprising the step of aligning the first coloring portion with the transmissive electrode part and aligning the second coloring portion with the reflective electrode part (see Fig. 17).

21. Regarding claim 15, Fujimori et al. discloses that the transmissive electrode part (12, Fig. 17) and the reflective electrode part (13) have principle surfaces of substantially the same height

22. Claims 1-7 and 9-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Baek et al. (U.S. Pub. No. 2002/0036730).

23. Regarding claim 1, Baek et al. discloses:

- A color filter (170, Fig. 3) for coloring a first light ray having a unidirectional optical path and a second light ray having a bidirectional optical path for each pixel, comprising: a first coloring portion (B, Fig. 3) for coloring the first light ray and a second coloring portion (C, Fig. 3) for coloring the second light ray, the first coloring portion having a greater thickness than the second coloring portion, the first coloring portion being formed in subsidence with respect to the second coloring portion with a principal plane of the first coloring portion (portion contacting layer 150) being different in height from a principal plane of the

second coloring portion (portion C contacting layer 160) by a predetermined value.

24. Regarding claim 2, Baek et al. discloses:

- The predetermined value is a value required to substantially equalize or mutually optimize a first optical effect and a second optical effect, the first optical effect being to be exerted on the first light ray by a portion of a liquid crystal layer corresponding to the first coloring portion, and the second optical effect being to be exerted on the second light ray by a portion of the liquid crystal layer corresponding to the second coloring portion when the liquid crystal layer is used in a liquid crystal display panel to which the color filter is applied.

25. The predetermined value disclosed by Baek et al. equalizes the color purity of transmitted and reflected light (**[0036]**, lines 9-13) and, in conjunction with the lower substrate, helps create a cell gap difference that is larger in the transmissive portions (see d3, d4, Fig. 3), thus ensuring equal retardation for both transmitted and reflected light.

26. Regarding claim 3, Baek et al. teaches the optical effect is an effect of causing retardation, as in claim 2 above. See paragraph **[0038]**.

27. Regarding claim 4, Baek et al. discloses that the first coloring portion has a thickness that provides a greater coloring effect than the second coloring portion, i.e. the first coloring portion (B, Fig. 3) is thicker than the second coloring portion. See paragraph **[0036]**, lines 9-21.

28. Regarding claim 5, Baek et al. discloses the first coloring portion has a thickness substantially twice as great as the second coloring portion (**[0037]**, lines 1-4).

29. Regarding claim 6, Baek et al. discloses the color filter further comprises a step-forming layer (160) of an optical transmissive material which supports the second coloring portion for providing the first and second coloring portions with thicknesses different from each other by the predetermined value.

30. Regarding claim 7, Baek et al. discloses the step-forming layer is colorless and transparent (**[0046]**, lines 1-2).

31. Regarding claim 9, Baek et al. discloses

- A liquid crystal display device (Fig. 3) using a color filter (170, Fig. 3) for coloring a first light ray having a unidirectional optical path and a second light ray having a bidirectional optical path for each pixel, comprising: a first coloring portion (B, Fig. 3) for coloring the first light ray and a second coloring portion (C, Fig. 3) for coloring the second light ray, the first coloring portion having a greater thickness than the second coloring portion, the first coloring portion being formed in subsidence with respect to the second coloring portion with a principal plane of the first coloring portion (portion contacting layer 150) being different in height from a principal plane of the second coloring portion (portion C contacting layer 160) by a predetermined value.

32. Regarding claim 10, Baek et al. discloses:

- The color filter (170) is provided on a substrate (150) at a display face side (see Fig. 3) of the liquid crystal display device.
- The opposite substrate (110) is provided with a pixel electrode (120, 140) comprising a transmissive electrode part (120) for causing the first light ray to be

transmitted therethrough and a reflective electrode part (140) for causing the second light ray to be reflected therefrom.

- An area of the first coloring portion is aligned with an area of the transmissive electrode part, and an area of the second coloring portion is aligned with an area of the reflective electrode part (see Fig. 3).

33. Regarding claim 11, Baek et al. discloses that the insulating layer (130, Fig. 3) can be omitted (**[0034]**, last four lines). This disposes the reflective electrode part (140) directly on the transmissive electrode part (120), resulting in principle surfaces of substantially the same height.

34. Regarding claim 12, Baek et al. discloses that there is a difference of height between principal surfaces of the transmissive electrode part and reflective electrode part, and a sum value of this difference of height and the predetermined value is a value required to substantially equalize a first optical effect and a second optical effect, the first optical effect being to be exerted on the first light ray by a portion of a liquid crystal layer corresponding to the transmissive electrode part, and the second optical effect being to be exerted on the second light ray by a portion of the liquid crystal layer corresponding to the reflective electrode part when the liquid crystal layer is used in a liquid crystal display device to which the color filter is applied.

35. Specifically, the structure disclosed in Fig. 3 requires the difference in height between the transmissive (120) and reflective electrodes (140) and the predetermined value add up to ensure equal retardation in both transmissive and reflective areas.

36. Regarding claim 13, Baek et al. discloses:

- A method of manufacturing a color filter (170, Fig. 3) for coloring a first light ray having a unidirectional optical path and a second light ray having a bidirectional optical path for each pixel, comprising the steps of:
- Depositing an optically transmissive material (161, Fig. 5A) on a base layer (150).
- Patterning (Fig. 5A and 5B) the deposited layer of optically transmissive material to form a step forming layer (166) wherein at least one recess-shaped portion (B, Fig. 3) is formed for a pixel, the recess-shaped portion having a bottom face of a predetermined shape corresponding to an area wherein the first light ray is caused to be transmitted and a wall face of a predetermined height;
- Depositing a material (170, Fig. 3) for coloring the first and second light rays on the step forming layer and the recess-shaped portion so as to form a first coloring portion (B) for coloring the first light ray and a second coloring portion (C) for coloring the second light ray, the first coloring portion having a greater thickness than the second coloring portion, the first coloring portion being formed in subsidence with a principal surface of the first coloring portion being different in height from a principal surface of the second coloring portion by a predetermined value.

37. Regarding claim 14, Baek et al. discloses:

- A method of manufacturing a liquid crystal display device, comprising the steps included in a method as defined in claim 13, wherein the color filter (170, Fig. 3) is provided to one substrate (150) of the liquid crystal display device and the other, opposed substrate (110) is provided with a pixel electrode (120, 140)

comprising a transmissive electrode part (120) for making the first light ray to be transmitted therethrough and a reflective electrode part (140) for making the second light ray to be reflected therefrom, the display device manufacturing method further comprising the step of aligning the first coloring portion with the transmissive electrode part and aligning the second coloring portion with the reflective electrode part (see Fig. 3).

38. Regarding claim 15, Baek et al. discloses that the insulating layer (130, Fig. 3) can be omitted (**[0034]**, last four lines). This disposes the reflective electrode part (140) directly on the transmissive electrode part (120), resulting in the transmissive and reflective electrode parts having substantially the same height.

Claim Rejections - 35 USC § 103

39. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

40. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baek et al. (U.S. Pub. No. 2002/0036730) in view of Fukuyoshi et al. (U.S. Patent No. 6,483,562).

41. Baek et al. has been discussed regarding claim 1 above.

42. Regarding claim 8, Baek et al. discloses that the step forming layer (160) includes an optically transmissive base material and functions as a dispersion layer (**[0039]**) so that a wide viewing angle can be obtained without forming an additional dispersion film.

43. Baek et al. does not teach multiple particles of optically transmissive material having a refractive index different from that of the base material and being scatteringly mixed into the base material.

44. However, Fukuyoshi et al. (U.S. Patent No. 6,483,562) discloses a transparent resin (33, Fig. 5) with multiple particles (SCATTERING PARTICLES, Fig. 3) having a refractive index different from that of the transparent resin (col. 4, lines 30-44) in order to form a light scattering (i.e. "dispersion") film.

45. Fukuyoshi et al. further teaches that the formation of an optical scattering element (like a microlens) requires an extra photolithography step and randomization of patterning (col. 28, lines 37-50). However, when the optical scattering element is replaced with a transparent resin with scattering particles, the manufacturing process does not require an extra photolithography step or randomization, and thus has the advantage of enabling an extremely simplified manufacturing process (col. 28, lines 51-60).

46. It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the microlens scattering array taught by Baek et al. using the transparent resin with scattering particles taught by Fukuyoshi et al. in order to have a simplified manufacturing process.

Conclusion

47. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Il (U.S. Pub. No. 2004/0169796) discloses a step forming layer with light scattering particles dispersed therein. Ha (U.S. Pub. No. 2003/0160914) discloses a step-forming layer made with light scattering particles, and the transmissive region is formed in subsidence to the

reflective region. Ikeno et al. (U.S. Pub. No. 2003/0053012) teaches forming the transmissive and reflective electrodes at the same height. Kim (U.S. Pub. No. 2002/003596) teaches a color filter layer of different thicknesses.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Tynan whose telephone number is 571-270-1433. The examiner can normally be reached on Mon-Fri. 7:30-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew Tynan

Andrew Schechter

ANDREW SCHECHTER
PRIMARY EXAMINER